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STUDIES IN BARK CLOTH: *I. POLYNESIA*

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ABSTRACT

Bark cloth ("tapa" in the lingua franca of Oceania) is among the most ingenious conversions of plant materials to his uses ever devised by man.

From the inner bark (bast, liber) of three moraceous trees, and (less often) from a few other plants, he has provided himself, from very early times, with a cloth not only suitable for daily clothing but also with garments to be worn for ceremonial and religious observances or as an indicator of economic status. In parts of the world where climate and flora favor its manufacture and use, and from his loincloth to the "clothing" of his gods, man's use of bark cloth has been a basic element of his life for unnumbered generations.

Contact with cultures more technically advanced than his own has made available to him materials with which to replace his laboriously produced bark cloth, and has enabled primitive man in both the Old and New Worlds to abandon the use of bark cloth for clothing and domestic needs for suitable and practical substitutes. That he has not abandoned its use completely is evident from its presence today among the peoples of both Oceania and the Americas where groups retain the practice of traditional observances and customs. They continue to make bark cloth occasionally for everyday clothing, especially for work, and for mandatory ceremonial regalia.

The representative teaching collections of bark cloth in the Botanical Museum of Harvard University, which include examples from the 18th, 19th, and 20th centuries, constitute the basic references for this paper.

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FROM PAST TO PRESENT

The evolution of a museum in the twentieth century involves many challenges and some frustrations. Solving problems of provenance in the identifying of items in gift collections is especially baffling. Establishing provenance is a vital first step in determining the identity of an artifact in terms of its makers and where they live (or once lived) and of the materials and techniques of its manufacture. Although the journalist's "who-what-where-when-how—and sometimes why" is a useful beginning, the end of the story often hinges on "if" or "perhaps." And thereby sometimes hangs not a tale, but a mystery.

An intriguing mystery of the Botanical Museum collections might be called "the Minns Mystery." It concerns seven pieces of a collection of nine pieces of Polynesian bark cloth. What could be a key clue appears in Pauline Ames Plimpton's biography of her father, Oakes Ames, who was Curator of the Botanical Museum 1923–1927, and Director 1937–1945. Her book is a collection of excerpts from her father's journals, diaries, and letters.

Professor Ames mentions a visit from Miss Minns soon after the creation by an anonymous donor of a memorial fund to commemorate Professor Goodale. This could have taken place in 1923, when Miss Minns was in her eighties.

"Expressing her great admiration for Professor Goodale, she stated her wish to make a gift to Harvard for the benefit of the Botanical Museum, a memorial fund of \$50,000 . . . to be called the Mary Hancock Fund . . . the income to be used for economic botany." Professor Ames adds that "there was a twinkle in her old eyes" as she explained that the nest egg for the fund was a twenty dollar gold piece, a birthday gift to her great-grandmother, Mary Hancock, from her father.

Miss Susan Minns died in 1938, in her ninety-ninth year. The Botanical Museum is not mentioned as the beneficiary of any additional bequest in her will (dated July 17, 1936).

Instead, Miss Minns had lost no time in establishing the Mary Hancock Fund "of \$50,000 in memory of Miss [sic] Mary Hancock The income only to be used for the Economic purposes of the Botanical Museum and may include the purchase of

books.” This note is dated 1924 in *Endowment Funds of Harvard University*—June 30, 1947, Clafin, Treasurer, 1948. There is no mention of tapas (bark cloth pieces) in the will, nor is there any record of a gift other than a printed card (unsigned, undated) stating that these seven pieces now in the collection are her gift.

When—and even if—she gave them, and how and from whom she could have acquired them, are still unanswered questions, but an obituary notice in the *Boston Evening Transcript* of August 2, 1938, provides an educated guess. Identifying her as a collector-botanist and a biologist at Woods Hole, it also refers to her attendance at the Cambridge School for Girls directed by Professor Louis Agassiz and his second wife, Elizabeth Cabot Cary. Professor Agassiz’s son by his first wife, Alexander, then in his twenties, taught at the school. He later conducted several scientific expeditions to the South Pacific, where he collected native artifacts. Susan Minns, who continued her scientific associations into her mature years, is said to have performed botanical chores for both Louis Agassiz and Asa Gray. She may have received the pieces of bark cloth as gifts as a result of these associations or, like many residents of maritime Massachusetts at that period, may have received them from relatives or friends who had voyaged to “the South Seas.”

At some time after 1976, Scott Wilder, Curatorial Assistant, in the Botanical Museum, reviewed the contents of storage rooms. He found two unlabeled packages wrapped in heavy paper. One of these was a roll of seven pieces of decorated bark cloth, with a printed card stating that they are the Minns gift and another card describing bark cloth in general. The other package contained a large piece of bark cloth, folded square, without any obvious identification. At the same time, Wilder found another large piece of undecorated bark cloth. A note folded inside it, dated August 17, 1928, signed “J. S. Pray”, stated that it had been brought to him from Colombia “twenty years or more ago, and was said to have been made from the inner bark of one of the native trees.”

The “Minns tapas” have been placed on display in the Nash Lecture Hall of the Museum. The single tapa hangs in the corridor opposite the Director’s office. The third “find”, now

identified as a blanket, is not displayed. Other specimens of bark cloth from both Oceania and the Americas are displayed in the Nash Lecture Hall in a flat case with a bark cloth beater from the Pacific. In the rare book section of the Economic Botany Library of Oakes Ames of the Botanical Museum, there is a sample book of many pages of pieces of Oceanic bark cloth bound together.

In addition to these major items, other specimens of plant products related to the manufacture and uses of bark cloth are kept in storage.

BAK CLOTH DESCRIBED

As a distinguishing component of diverse cultures, bark cloth cannot be described alone in general terms. Not only are there both similarities and differences between the bark cloth of the tropical Americas and that of Oceania, northeast Asia and Africa, but also there are variants of manufacture and uses within these regions. The question, "Why?" constantly arises. The answer depends on availability of materials; on inter-group contacts; on hypothetical or known migrations; perhaps most of all on the myths and legends of a people and the sum of their customs over many generations.

In Oceania the population of certain islands rather than others, depended on ocean currents and winds and on distances within the limits of navigation by rafts with daggerboards and matting sails, by canoes with outriggers and sails, or by double sailing canoes (catamarans). On the other hand, in the tropical Americas, rivers and their watersheds and the locations and accessibility of mountain valleys were of paramount significance in the establishment of settlements.

Like other widespread culture traits that developed in the distant past (such as tattoo and body paint, shamanism and the use of consciousness-altering drugs), bark cloth is similar to a theme and variations in a musical composition. The theme is constant, and the variations develop the possibilities of the theme by means of additions and alterations, or even of new concepts.

This paper, in addition to stating the theme, considers such variations as are reflected by the designs, colors, and techniques

of manufacture of bark cloth on the basis of study of the collection at the Botanical Museum. It divides this consideration into two parts: first, the bark cloth of Oceania and second, that of the Neotropics.

Bark cloth is defined as a fabric, as the generic term for all fibrous constructions. The term "textile" refers specifically to woven (i.e. interlaced warp-weft) fabrics (Emery 1966).

Emery summarizes the technique of bark cloth manufacture: "Beaten bark cloth is fashioned from sections of the inner bark of certain suitable trees and shrubs. . . . The inner bark of trees and shrubs of the . . . Moraceae is especially suited to the production of beaten bark cloth, due in part at least to the natural interlacing in the fibrous structure. The wild fig, the paper mulberry, and the breadfruit tree yield the inner barks which are probably most extensively used for beaten bark cloth. . . ."

"The length, breadth, and thickness of the finished fabric are not entirely dependent on the size of available strips of bark, since in addition to the extending effect of the beating or pounding, it is possible to bond separate pieces at their edges to increase the area, and layer to layer to increase the thickness.

"The combined soaking and beating, which results in crushing the succulent portions of the inner bark and felting the fiber structure, causes overlapping of superimposed pieces to adhere to each other and makes the reinforcement of weak or thin spots as simple and practical as are the additions to size and thickness. In lieu of natural bonding, glue, paste, gum, or sewing may be used to attach the strips, layers, or patches.

"The making and use of beaten bark cloth has a wide distribution through the tropical and sub-tropical regions of Africa, Southeast Asia, the islands of the Pacific (Oceania) and the Americas. . . ."

". . . there is considerable diversity in the terms used in different areas to designate the finished fabric. . . . The most familiar. . . is tapa."

Bark cloth is known in the South Pacific by other names, depending on where it is made. It is hiapo or siapo in Samoa,

Uvea, Niue, the Marquesas, and some other islands. In Tonga, the principal tree from which it is made is called hiapo and the bark cloth is gatu. In Fiji, both tree and cloth are masi.

Among descriptions of bark cloth, technical accounts such as Emery's must take first place in terms of clarity, accuracy, and dependability. Still, it is a temptation to supplement them with early eyewitness accounts. Classic among such accounts is that of Joseph Banks, naturalist on Captain James Cook's first voyage (1768–1771).

Brigham (1976) quotes from the journal that Banks kept (scientific names in brackets, added by Brigham). According to Banks, the Tahitians made bark cloth from "the internal bark or liber of three . . . trees, the Chinese paper mulberry (*Morus papyrifera* [*Broussonetia papyrifera*] the breadfruit tree (*Sitodium utile*) [*Artocarpus incisa*] and a tree much resembling the wild fig tree of the West Indies, (*Ficus prolixa*). . . . Their mode of manufacturing the bark is the same for all the sorts The bark is stripped and taken to running water where, held down by stones, it is left for several days.

"The women servants go down to the river, and stripping themselves, sit down in the water and scrape the pieces of bark, holding them against a flat smooth board, with the shell called 'Tiger's tongue' (*Tellina gargadia*). . . until all the green bark is rubbed and washed away and nothing remains but the very fine fibers of the inner bark. . . . This bark is then spread out on plantain leaves, care being taken to form layers of equal thickness, and left overnight.

"It is then taken away by the women servants, who beat it in the following manner: they lay it upon a long piece of wood, one side of which is very even and flat . . . as many women as can work at the board together begin to beat it. [They use] a baton made of the hard wood, etoa (*Casuarina equisetifolia*). . . about a foot long and square, with a handle; on each of the four faces . . . are many small furrows whose width differs on each face. . . . They begin with the coarsest side . . . and continue until the cloth, which extends rapidly . . . shows by the too great thinness of the groves [sic] . . . that a finer side of the beater is requisite . . . they proceed to the finest side, with which they finish.

“Imperfections in the cloth are remedied by the principal women in the group, who trim edges and apply patches with the use of a paste made of the root of arrowroot (*Chaitea tacca*) [*Tacca pinnatifida*].”

Banks proceeds to the Tahitian method of dyeing: “They use principally two colors, red and yellow. . . . They also on some occasions dye the cloth brown or black, but so seldom that I had no opportunity. . . of seeing the method, or of learning the materials they make use of. . . . To begin with the red. . . . [It] is made by the admixture of the juices of two vegetables neither of which . . . have [sic] the least tendency to the color of red. . . . The plants are *Ficus tinctoria* and *Cordia Sebestena*. . . the fruits of the first, and the leaves of the second, are used in the following manner:

“The fruit. . . produces, by breaking off the stalk close to it, one drop of milky liquor. . . . This liquor the women collect. . . shaking the drop. . . into a small quantity of coconut water. . . . When the liquor is ready, the leaves are. . . well wetted in it, they are then laid upon a plantain leaf, and the women. . . turn and shake them about; afterwards. . . to squeeze them. . . and in about five minutes the color begins to appear on the veins of the. . . leaves, and in ten or a little more, all is. . . ready for straining. . . . For straining they have a larger quantity of the fibers of a kind of *Cyperus* grass (*C. stupeus*). . . . In this grass they envelop the leaves and. . . express the dye. [They keep the grass to use as a brush to lay the color on the cloth]. The receptacle for the liquid dye is always a plantain leaf. In laying the dye upon the cloth they. . . spread the outside of it with a thin coat of dye.”

Banks mentions several other reds which are produced by mixing with the fig juice *Tournefortia sericea*, *Convolvulus brasiliensis*, [*Ipomoea pes-caprae*], *Solanum latifolium*. “Their yellow . . . is made of the bark of the root of a shrub (*Morinda umbellata*). This they scrape into water and after it has soaked . . . strain the water and dip the cloth into it.”

In a footnote, Brigham expresses surprise that Banks does not mention the use of fern leaves as stamps, citing red leaves on yellow grounds as an example. In the description quoted, Banks does not describe designs. Kooijman (1972) notes the use of fern leaves as especially characteristic of Tahitian bark cloth decoration.

England was aware of the Pacific centuries before Banks sailed with Cook. In 1555, Richard Eden furnished the first collection of voyages in English, *The Decades of the Newe Worlde or West India*. Richard Hakluyt's *The Navigations, Voyages, and Discoveries of the English Nation* (Ed. 2, 1598–1600) became an indispensable source of knowledge about the still-mysterious parts of the globe.

Before these compilations appeared, Antonio Pigafetta's journal and his *Relation* of Magellan's circumnavigation (1519–1522) had astounded and edified first "His Sacred Majesty Don Carlos" (Charles V of Spain) in 1522 and then, in oral, written and printed form, became known all over Europe.

Pigafetta's mention of bark cloth in the Pacific may be the earliest detailed available by a European and, as such, must be regarded as significant. His *Relation* remains the only surviving record by an eyewitness of Magellan's voyage. Magellan's own journal and the records of those who succeeded him in command after his death in the Philippines have never come to light.

A young Italian who describes himself as "Patrician of Vicenza [therefore a Venetian citizen] and Knight of Rhodes", Pigafetta went to Spain in 1519 in the suite of the Papal Ambassador to the Court of Spain. Hearing of the plans for Magellan's voyage and wanting "to see the great and wonderful things of the Ocean Sea", he obtained permission from both King Charles V and the Ambassador to accompany Magellan as a volunteer. He sailed in the flagship, *Trinidad*, September 20, 1519, and returned to Spain in *Victoria* (the only ship to return) September 26, 1522. Upon his return, he presented to the King "a book written by my hand treating of all the things that had occurred day by day on our voyage." In March 1523 he amplified this account to his full *Relation*.

The source from which all four extant manuscripts—three in French, one in Italian—derive, is the copy of this *Relation* that he presented to the Grand Master of the Order of St. John in 1525.

Pigafetta, then in his thirties, was well equipped for his voyage. He had read travel books, including Marco Polo's account of his travels (but whether in manuscript or a printed book is not clear);

he had seen service at sea as a member of a military order; he was—as revealed in his writing—a man of unflagging curiosity, capable of absorbing observations and scrupulous in recording experiences. He not only kept a journal but also carried a notebook whenever he went ashore. Communication with natives was one of his gifts, as is shown by his inclusion of four native vocabularies in his *Relation*.

On a Sunday, Pigafetta writes, he went ashore “to see how the cloves grow.” His descriptions here of both cloves and nutmegs could well be include in any botanical text.

The juxtaposition of these descriptions with that of the making of bark cloth suggests that possibly he saw it made on this same excursion. “The women,” he states, “go naked like the others, with these cloths of bark, and those cloths are made after this fashion. They take a piece of bark, which they soak in water until it is soft, then they beat it with wood so that it becomes as long and as wide as they wish. And it is like a cloth of raw silk, with threads in it making it appear as if woven.”

This and the following references to bark cloth are from the Beinecke-Yale manuscript, in French, translated and edited by R. A. Skelton.

Pigafetta’s comments on bark cloth present puzzling contrasts of the accurate and the mistaken. For example, he describes “a bark as thin and supple s paper, which grows between the wood and the bark of the palm tree.” To this exact description of bast fiber he adds that the palm is its source. Since palms have neither bast nor bark (as these structures are defined botanically), why does Pigafetta state in other passages as well as here that the palm provides the material for the manufacture of bark cloth whereas in some passages, he does not mention the palm?

Girl musicians wear “a garment made of the said palm cloth.” A queen’s attendants are naked . . . except that their shameful parts were covered by a cloth made from the palm tree The people of a certain island wear . . . only a piece of cloth made of palm around their shameful parts.”

On the other hand, in two other descriptions of clothing, he refers to “cloth made of the bark of trees” and “the women are

clad in tree cloth from the waist down.” Mentioning the scribes of a ruler, he says that they write on “very thin tree bark”, and he describes the sail of a junk as made of “the bark of trees.”

There is no hint of a reason for Pigafetta’s use of or omission of “palm”; possibly he saw bark removed from another kind of tree and, as a result, chose the general rather than the specific.

In his mentions of bark cloth, Pigafetta himself is not always primarily responsible for errors. In the Beinecke-Yale manuscript, it is stated that the bark is beaten “avecq du boys,” translated as “with wood.” In the Ambrosian manuscript, the phrase is “co legni”, translated as “with bits of wood.” Since there is no explanatory note in either translation, the answer to this puzzle must be that neither Skelton nor Robertson realized that Pigafetta could have been saying that a wooden beater was used. Pigafetta’s description of the finished cloth as “like a cloth of raw silk with threads in it making it appear as if woven” strengthens this assumption. If undecorated bark cloth is examined with back-lighting, the “watermarking” made by geometrically patterned beaters is plainly visible and suggests the texture of woven cloth. Pigafetta was here most probably referring to an implement made of wood or even simply to a stick of wood used.

Mistakes are inevitable when observation is faulty or when translation stops at the literal although accuracy depends on extension. In addition, in the case of handwritten manuscripts such as Pigafetta’s *Relation*, mistakes result from a scribe’s misunderstanding of a word or when, in transcription, he alters a phrase.

What source is responsible for Pigafetta’s statement that bark cloth is obtained from palms, is not stated in any of the literature consulted. In reading Marco Polo, he must have noticed (no matter which manuscript or printed book he used) that Polo nowhere mentions the palm, but refers either to “certain trees” or specifically to the mulberry, “the leaves of which are fed to silkworms” and in both cases states clearly that it is the inner bark that is utilized for making both paper and cloth for summer clothing in China.

BARK CLOTH IN POLYNESIA

The so-called "Polynesian triangle" extends from the Hawaiian Islands on the north to Easter Island on the east, to New Zealand on the south, to the Ellice Islands on the west (with a jog around the Fiji Islands).

The definition of the triangle is more or less arbitrary, because there are islands outside of its periphery that are considered "Polynesian" in material culture or in other respects (Goldman 1970). The islands of the South Pacific are of four types: continental islands, volcanic islands, coral islands (atolls), and raised coral islands (lacking reefs). Their variation in quality of soil and plant life influenced the pattern of South Pacific settlement by early voyagers. Some of these voyages are believed to have reached Polynesia between 1000 B.C. (or earlier) and 1000 A.D., according to evidence from tradition, archaeology and linguistics (Goldman 1970). By a slow rate of diffusion, peoples from areas west of Polynesia, probably from South-East Asia or East Africa, taking advantage of winds and currents, may have journeyed by way of Indonesia (Barrau 1963; Goldman 1970; Kooijman, 1972; Dodge 1976). By raft, canoe, double canoe—all equipped with matting sails and using primitive navigational devices—these voyagers emigrated from societies characterized by chieftanship, craft specialization, and rank and status orientation (Degener 1975; Goldman 1970).

They embarked their families and carried stores of food and water (some as water-coconuts) and they wrapped plants from their food-plots in damp earth or bark to preserve them for arrival at some landfall. Among these plants, in all probability, they valued especially the moraceous paper mulberry (*Broussonetia papyrifera*) and breadfruit (*Artocarpus altilis*), both indigenous to the lands from which they had come. These plants had furnished them with material for cloth and a basic food. Another moraceous tree, *Ficus* spp., they found growing wild on many islands in Polynesia, and they made bark cloth of it as well (Degener 1975).

Until the surge of European and American contacts following Cook's three voyages (1768, 1772, 1776) and into the early years of the nineteenth century, cloth made of beaten bark was the only fabric used in all but a few islands of Polynesia. On these few, the leaves of *Pandanus*, laboriously prepared, were plaited into a mat-like fabric as well as into mats of various types and uses.

Bark cloth was used for clothing and wall hangings, house partitions and bedding; it was also an integral part of ceremonial observances. In its manufacture, traditional techniques, carried out with traditional tools, went back for many hundreds of years. Implements, as well as the bark cloth itself and its decoration, were made from plants, with the single exception of a reddish clay used as a dye found on some islands and traded to others.

Culture change, initiated principally by Protestant missionaries, brought about the diminished importance of bark cloth (especially in eastern and marginal Polynesia) due in most cases to the abandonment of motives and occasions for its use. Today, bark cloth survives on some islands, principally in western Polynesia. It is still made for community use (e.g. weddings and burials) for which it is made and decorated according to tradition. Tradition also survives in formal academic events at the University of the South Pacific at Suva, Fiji, where academic regalia include a stole, the design of which features patterns of bark cloth together with decorations used on other native materials from islands where that university has branch campuses.

BARK CLOTH FROM POLYNESIA IN THE BOTANICAL MUSEUM

The teaching collections of the Botanical Museum include nine pieces of bark cloth, a book of bark cloth samples, and a beater. The problem faced by the Museum has been to establish provenance and to employ supplementary means of identifying this material. The Museum has been fortunate in enlisting the interest and assistance of Professor Simon Kooijman of the Rijksmuseum voor Volkenkunde, Leiden, in the establishment of provenances and in the availability of his publications on bark cloth. Originally approached with one specific query, Kooijman suggested

that he be sent color transparencies for study and comparison with his own records at the museum in Leiden. These transparencies, sent to him as an addition to his personal resources, he presented to the Rijksmuseum. Thus, the name of Harvard's Botanical Museum has been added to those of other sources of information on bark cloth around the world.

Professor Kooijman's opinions on the Botanical Museum bark cloth are quoted verbatim. His illustrative references are taken from his *Tapu in Polynesia* (1972), based on data recorded in the literature and on inspection of museum collections around the world. For his botanical identifications he consulted botanists from the Rijksherbarium, Leiden. Notes supplementing Kooijman's comments are the result of exhaustive search in the literature, including supplementary data on Polynesian bark cloth from his field study, *Tapu on Moce Island, Fiji* (1977).

Nash Lecture Hall-Lab. 7 pieces: ("the Minns Tapas")
Accession number 8610 (same for all).

Case 407: 5'3" × 3'7½" (158 × 110 cm); black on ecru.

Case 408: 48" × 34" (113 × 85 cm); black and brown on ecru. (Both are circular patterns).

Case 407: "I do not think there could be much doubt as to their Samoan origin. Elements of the pattern of 407 supporting this idea are the row of triangular points at the outside (T.i.P. Fig. 222), the frequent use of hourglass-shaped motifs (T.i.P. Fig. 185), and the central figure which is probably related to the swastika figure (T.i.P. Fig. 220 shows such a figure consisting of four elements). Moreover, the inner part of the pattern seems to suggest a turning movement . . . not uncommon in the decoration of Samoan tapas (T.i.P. Figs. 211–216, 220)."

Case 408: "The pattern of 408 is static in character. The central motif equals the one in T.i.P. Fig. 220. This pattern also shows rows of triangular points. The second circuit from the middle is filled with a rectilinear decoration comparable to the one in T.i.P. Fig. 181. The row of motifs in the first circuit remain a puzzle."

Note: These motifs suggest the shape of the stingray, with zigzag tail representing motion. According to Grzimek's *Animal Life*

Encyclopedia, 1973, Vol. 4, some species of stingray inhabit Pacific waters. One of these, *Taeniuya Lymna* (sometimes over six feet long) frequents shallow waters at night, where it is a hazard to bathers and divers. Since animal forms are known to appear in some tapas as well as in tattoo designs, this stingray theory may well be valid. Professor Kooijman (pers. comm.) would agree if there were evidence of folk experience with rays reflected in folklore or sayings. Nelson 1925 and Schultz 1945 list a popular Samoan saying: "The stingray (fai) escapes but it leaves its barb behind," which expresses a common conviction that "the evil a man does lives after him." In his *Narrative . . .* (1853, Vol. I) the Rev. William Ellis, enumerating South Pacific sea fishes, mentions "a great number of the ray species, from the large 'diabolus' to the smallest kind. . . ."

Case 409: 5'9" × 3' (173 × 90 cm); black and brown on ecru. "The tapa of 409 is unmistakably Fijian. The one in my photo collection nearest to it is the tapa from the Smithsonian Institute [Institution] collected during the Wilkes expedition (T.i.P. Fig. 348). The latter was probably acquired on Vanua Balavu. I should hesitate however, similarly to locate your tapa. There are quite a few tapas with this kind of patterning which are only generally localized 'Fiji' and we do not know whether this type may have had a wider distribution."

Note: Plate 12 in Brigham 1976 shows a Fijian example of this same design of "hairy diamonds" alternated with conventionalized birds in the outer border (collected at Suva, Fiji by Brigham in 1896). Birds also appear in Kooijman 1972, Figs. 337 and 409. The absence of birds in the Botanical Museum example may or may not alter provenance.

Case 410: 4'7½" × 33" (140 × 82 cm); black and brown on ecru. "As to 410, I tend to ascribe it to Uvea (Wallis Island). The Bishop Museum in Honolulu is in the possession of a collection of Uvea tapas, some of which were published as illustrations in T.i.P. Figs. 229 ff. In my files in the Museum I found the photo of Bishop Museum C 5101 (32737), the pattern of which in its general design looks like the one of 410."

Note: T.i.P. figures 229 and 232 feature oval motifs placed diagonally in squares and rectangles of rubbed design, apparently drawn freehand similar to those on the Botanical Museum piece. In view of the use of animal forms on tapas, there is a possibility that this represents *bêche-de-mer* (trepang, sea slug). This marine animal, great numbers of which inhabit the shallow waters off reefs in the Fiji area, became an especially important item of the Pacific trade with China between the 1820s and the 1840s (E.S. Dodge, 1965, 1976). Since a large working force was recruited to harvest and cure these holothurians, they could have engaged the attention of the islanders even to the point of representation in tapa patterns. Those shown could have been added to already completed rubbed designs done with design tablet techniques. The design of this example is probably of Uvean origin and would have been made on a leaf design tablet, not one of carved wood. Leaf tablets are made of layers of *Pandanus* leaves laid crosswise to each other, interlaced and sewn tightly together with coconut fibers. A relief design is superimposed on this foundation and appears on the bark cloth when it is stretched on the tablet and rubbed with a dye-saturated wad. This rubbed pattern is later strengthened and emphasized with hand painting in a darker color. In this case, the emphasis is on the darker oval shape which may or may not represent a sea slug.

The rubbed pattern of this tapa has a wide border of scattered hand-painted motifs and a narrower border of very dark brown or black, the edge of which is cut into large triangular dentils. In Kooijman (1972, Figs. 234 and 235), there are similar pieces attributed to nearby Futuna (Hoorn Islands). Brigham (1976, Plate 224) depicts a very similar piece.

Case 411: 4'6" × 5'3½" (135 × 159 cm); black and orange on ecru. "I am not sure about 411. I did not find similar patterns in my photo collection of western Polynesian tapas. However, I would suggest a Samoan origin, mainly because of the cross-like flower motifs which I found in a more stylized form on a Samoan tapa (T.i.P. Fig. 194)."

Note: The cross-like flower motifs of the Botanical Museum piece are angled on oblique parallel lines covering its entire surface. Many of the “flowers” are black or black-barred and some are bright orange outlined in black.

Orange is not listed among characteristic tapa colors in Kooijman (1972, Table E), but it may be assumed that orange might be produced by mixing red and yellow. On the other hand, *Bixa Orellana* was introduced in the early 1800s into the Pacific (Merrill 1954; Brigham 1976), so it could have been used in this case. *Bixa Orellana* contains two coloring components: orellin (yellow, soluble in water) and bixin (red, soluble in both water and greases) (*Kew Bull.* 1887, No. 7). Depending on its preparation, *B. Orellana* may produce cinnabar red, orange, or yellow.

A third possible source of orange might be turmeric (*Curcuma longa*) utilized in Polynesia for generations as a yellow dye. The tubers of *C. longa* produce yellow, yellow-to-orange, red or a reddish-brown colors (Burkill 1935; Hill 1952). The question of dyes—their identities and preparation—is complex in itself. If the reports of observers were consistent, at least a color in question could be determined. The color of leaf-forms on this tapa, for example, was seen by various observers as pink or even red rather than orange.

Case 412: 4'2½" × 22½" (128 × 58 cm); black, brown, brownish red on ecru. “[Its] Futunan provenance cannot possibly be doubted (T.i.P. Fig. 256 f).”

Note: This tapa has a sort of checkerboard pattern. Kooijman (T.i.P. 1972) calls attention to the step-shaped motif seen so frequently on these tapas “that it may be regarded as a ‘guide fossil’ to borrow a term from geology, to the Futunan origin of the tapas carrying it.” He adds that this motif “shows a strong resemblance to patterns formed by weaving and plaiting techniques (Figs. 241, 242) for mats.” Accepting this resemblance, he speculates with emphatically expressed caution, on the transmission of these patterns to islands where bark cloth was made. He summarizes the possibilities: “. . . it may be said that the *salatsi* represent an old, traditional form of tapa decoration borrowed from Marshall Islands plaiting patterns and owing its origin to

overseas contacts . . . made either via intervening island groups or directly from the Marshall group. It is also possible that in the early period European or American ships played a role in this contact (T.i.P. p. 282).” [This question of borrowings from island to island arises constantly when provenance is considered.]

This piece, identified as Futunan, is enriched with a narrow border of figures picked out in dark red to match a wide border of the same rich coloring.

On some islands of Polynesia, both tapa and mats were made. According to Buck (1930), household furnishings and clothing were made from both the beaten and decorated bark of *Broussonetia papyrifera*, the paper mulberry, and the laboriously prepared leaves of at least three species of *Pandanus*, all of which were cultivated especially for these uses. When she first arrived in Samoa, Mead lived for ten days in the house of a Samoan chief’s family where “a great tapa curtain some 12 by 20 feet, was stretched across one end of the oval house to make a room for me, and my bed and Fa’amotu’s were behind it. For my bed some twenty fine mats . . . which it takes a woman a year or more to make . . . were spread upon the floor . . .” (Mead 1977). Mead (1973) describes the types of mats used in Samoa and how and at what age girls were taught to plait them and also how to make decorated bark cloth.

Case 413: 5’5” × 46” (163 × 125 cm); black and brown on ecru. “[the tapa] is definitely Samoan. You can compare it with the drawing in T.i.P. Fig. 182. The latter was taken from a tapa in the Peabody Museum in Salem. I sent the photo to Mrs. Maxine Tamahori in New Zealand, who is an expert on Tongan tapa . . . She wrote to me that the pattern appeared to be a Tongan arrangement. I think, however, that she was mistaken, being so much concentrated on Tongan material but knowing too little about Samoan bark cloth and Samoan designs.”

Note: A possible reason for confusion in establishing provenance may be that this piece seems to have been brushed over with a semi-transparent reddish-brown glaze before the pattern of triangles was painted on it. According to Tamahori (1963), this glaze, a Tongan technique, gives the cloth stiffness and imparts a slight

gloss to its surface. On the other hand, the character of the pattern cannot be questioned. Kooijman (1972) sees "the square and the rectangle containing diagonal lines crossing from the corners [as] one of the basic motifs of the Samoan tapas." This piece may be considered an instance of a Samoan borrowing of a Tongan technique.

In addition to his identification of the group of all nine examples of Polynesian bark cloth in the Botanical Museum, Kooijman provided information on one of two other tapas that round out the collection:

Fifth floor corridor, mounted on wall.

Accession number 8615 (iden. ACR, 11 and 11D) 7'5" × 6'3" (223 × 183 cm); black on white.

"I found your ACR No. 11 (11-D) in my own file. I photographed the tapa in 1954 during my research in museums in New England. The piece was not localized, and I suggested then that it came from Niue. This localization seems to be corroborated by the similarity of the lowest figure in the second vertical row from the left to one of the figures in T.i.P. Fig. 275. On the other hand, however, the figures in the pattern of the Botanical Museum piece have also elements characteristic of Samoan bark cloth patterns and because of that, I have begun to doubt the Niuean origin."

Note: The white ground of this tapa could have been produced with a wash of white clay. The thickness and stiffness of the bark suggest use of *Artocarpus altilis* which, according to some reports, furnishes a whiter and stiffer cloth than does *Broussonetia papyrifera*.

From whom and at what date the Botanical Museum received this piece is not known. In anticipation of the present study, the four corner areas of its reverse side (where identification is customarily placed) were examined and no labels were found. Some time after Kooijman's list of provenances was received, this piece was taken down for temporary storage. An examination of the entire reverse side disclosed pasted at the center, a blue-bordered 2" × 3" gummed label which showed no sign of age and a green jeweller's tag attached by its string to the bark cloth. Both bear the

number D 2001 and on the label there is also, in blue ink, the letter C. On the label, in brown ink (faded from black?) is written in a nineteenth century hand: "Hiapo (or Tapa) from Savage Island." Near the label is scrawled a large \$3.50; there is also a word (indecipherable) scrawled over with blue-pencil.

The original name of Niue was "Savage Island", so named by Captain Cook in 1774 because of the hostility of the inhabitants. Kooijman's identification is thus confirmed by the evidence on the tapa itself, assuming that its provenance was correctly noted in the first place.

Accession Number 8611:

Flat case 409: 133" × 20" (338 × 51 cm); black on reddish brown. Sash (oro), part of a wedding costume, a handsome example of contemporary decorated bark cloth made on Moce Island in the Lau group of the Fiji archipelago. The only example of Fiji's contemporary tapa (masi) in its collection, the Botanical Museum received this piece in 1980 as the gift of Mr. and Mrs. Alan Bodger, who acquired it in 1979 while residents of Suva, Fiji. This oro, worn over a skirt (sulu), is elaborately finished with deep cut fringe and on one side has fringe consisting of triangular, pierced dentils dangling from thin strips of bark cloth. The predominant figure decorating this sash is a favorite, the conventional vutu-tutki, alternated with smaller rosette figures of various designs, all set off with repeated motifs forming borders which extend onto the fringe at both ends of the oro.

These ornamental patterns are applied by means of stencils in a technique unique in Oceania to Fiji. Until recently, the stencils were cut out of banana leaves. The name drudru (leaf) is still applied to the stencils used today, but they are cut from 14" × 17" exposed x-ray film.

An unusual feature of this sash is the clear reddish brown color of the cloth. Staining large pieces of cloth brown before decoration is applied is characteristic of Tonga. The reddish brown color is developed by either smoking or immersion. The smoke of a slow fire made of either *Cordyline terminalis* or of green sugar cane (*Saccharum officinarum*), over which the cloth is suspended, is preferred (Roth 1934). Sometimes the cloth is soaked in coconut

oil before being smoked (Thompson 1940). The immersion method consists of soaking the cloth in oil mixed with powdered mangrove root and drying it indoors to develop a burnt orange color.

The black coloring matter used in Fijian stenciling is a mixture of kesa, a liquid dye extracted from the roots of the gadoa tree (*Elaeocarpus Storckii*) and soot. In former times, this soot was produced by burning the kernels of candlenuts (*Aleurites moluccana*) in a smoldering fire over which was suspended a large shell or a sheet of tin rubbed on the under side with the bark of *Hibiscus tiliaceus* to make it sticky. The thick, oily smoke thus produced accumulated as soot.

This method has been superseded today, with few exceptions, by the use of a kerosene lamp turned so high that the wick smokes, placed in a biscuit tin with one side removed. The soot accumulates in thick layers on the side of the tin (Kooijman 1977).

Accession number 8614:

Economic Botany Library of Oakes Ames (rare book case; RB49)
Sample book, approximately 14" × 9½" (36 × 24 cm). Original binding (Russia leather, in poor condition, replaced 1981).

Examined when it had its original cover, this book was found to contain some fifty leaves of bark cloth samples, approximately 13½" × 9". Most of the pieces are patterned. Undecorated leaves, when viewed with back-lighting, show the "watermarking" made by the geometric patterns on beaters especially characteristic of Hawaiian bark cloth. On the first page is written, "From George G. Kennedy, M.D., Milton, Mass. This gift to the Harvard Botanical Museum was received May 29, 1906."

Originally pasted onto the inside front cover and now reattached there, is a clipping apparently from an unidentified sale catalog: "1198-Sandwich Islands [Hawaii]. Tapa cloth or natural lace made from the inner bark of one of the lace-bark trees, *Broussonetia papifera* [sic]. A volume containing 56 leaves of this cloth in different thicknesses and examples of the patterns dyed with the vegetable dyes such as are used by the natives. Size of leaf, 9 × 13½ inches, bound in half russia. Evidently a collection by some traveler or missionary. Exceedingly interesting, and unknown to many people."

Note: This sample book is very similar to one at the Boston Athenaeum (original binding, housed in a box, and to date unidentified). The two books have a general resemblance in most respects, including size and character of contents. Both contain examples of the same tapa designs and both contain approximately the same proportion of patterned and “watermarked” leaves. Some of the designs in both books are like those known to have been made by means of Hawaiian bamboo stamps (Brigham 1976, Plate 41) and the “watermarked” pages show patterns like those of Hawaiian beaters.

It is possible that the same compiler put both books (and possibly others) together, all cut from the same large pieces of tapa. Since neither contains any text material, it is likely that they were privately, rather than commercially, produced.

In 1787, bound volumes of bark cloth samples accompanied by a text were compiled and printed for Alexander Shaw. According to Kaeppler (1978) “a large number of the pieces included are from Hawaii and because of the date, it is unlikely that the pieces could have come from any other voyage than Cook’s.” Some pieces, she adds, are from the Society Islands and Tonga, and a few may be from Rurutu. Kaeppler states that about thirty Shaw volumes are known today (from many of which sections of leaves have been cut out). Also extant are other bound collections of bark cloth about which she does not offer details. According to Anne Leonard (1980), of the copies extant “each copy has a somewhat different selection and arrangement of tapa specimens.”

Some so-called “pirated” pieces of decorated bark cloth have come to light in Cambridge during research for this paper. In 1982, a large piece with a rather unusual blue background that was brought to the Peabody Museum of Harvard University for identification had a piece measuring about 9” × 12” cut out of one border. There are several small, obviously “homemade” booklets of decorated bark cloth pieces in storage at the Peabody Museum. Two of these are stitched together with ordinary sewing-thread (38-48-70/907). Another is accompanied by a handwritten note identifying it as bark cloth from the Hawaiian Islands, 1872 (142-15-70/2019). A third contains six undecorated, “watermarked” leaves (37623).

That there was no particular public disapproval attached to the use by individuals of pieces cut from large tapas is proven by a touching incident: Mrs. Cook, expecting Captain Cook's return to England from his third voyage and anticipating his appearance at Court, was embroidering paired pieces of decorated bark cloth for a waistcoat when the news of his death reached her. The pieces have been preserved—the embroidery never finished (Kaeppler, 1978, Fig. 221).

Accession number 8443:

Flat case 409

Bark cloth beater (ike and variant spellings). Overall length, 14" (35¾ cm), four-sided; three grooved sides (8 or 9 grooves each), one smooth side; handle rounded, slightly flared at bottom; differing from a great number of beaters examined at museums and reviewed in the literature, it has a pyramidal top arising from its four beating surfaces, instead of the usual squared off, flat end.

In a case of artifacts from Fiji at Harvard's Peabody Museum, there is a four-sided beater collected 1897–1898 by Alexander Agassiz (overall length 13" (35 cm), which has a shallowly pyramidal top with three small, hemispherical indentations midway of each side and one at the apex.

In reply to a query, Paul Tolstoy, who has made an exhaustive study of beaters, sent (pers. comm. 12/3/82) sketches of five quadrangular, grooved beaters with pyramidal tops, two of which are Samoan and three Fijian. One from Samoa has a "cup" at its apex. Tolstoy, quoting from his notes, states that of some fifty-nine beaters from Fiji of which he has a record, "about one third have these tops to some degree." He adds that they seem to be most common in Fiji. His examples are all from the American Museum of Natural History, New York. This is interesting in view of the apparent absence of such beaters at either Harvard's Peabody Museum (except one specimen) or the Peabody Museum in Salem. Photographs in Kooijman (1972) and Brigham (1976) sometimes show beaters with faintly rounded heads amid a majority of flat heads. A Tahitian beater (Kooijman 1972; Fig. 2) presents an interesting detail: on a flat top there is carved in low relief a four-sided shape, the four sides of which are directed to the

corners of the beater; this could suggest a transitional form between the flat and the pyramidal top.

Brigham's painstaking attention to detail in his description of bark cloth beaters and their use answers a natural question: why did not the grooves of beaters fill up with the soft pulp of beaten fibers? The fact is that they did become so clogged, and Brigham illustrates an instrument formerly used in Hawaii to ream out the grooves (Fig. 46, 4043 and Fig. 47). So few of these "de-cloggers" have survived, however, that he adds, "it may well be supposed that a sharp stick or edge of bamboo were the more common cleaners."

Of the tools and techniques associated with the making of bark cloth in Polynesia, beaters are the most constant in character. They may be made of any of several very hard woods (a favorite is *Casuarina equisetifolia*). They may vary an inch or so in an average length of some 17 inches (40 cm). The four sides of the beating end may be provided with varying numbers of grooves, spaced closely or widely apart. Beating end and/or handle may flare somewhat. There are exceptions: in ancient times, some beaters were club-shaped, and it is reported that a very occasional three-sided beating end has appeared. All in all, however, a beater always may be recognized for what it is and for what its use may be.

Because the beater is the essential agent in the transformation of the inner bark of certain trees into bark cloth, it is an ideal point of departure for a summary of bark cloth as a distinguishing trait of the material culture of Polynesia past and, to some degree, present. Bark cloth is known in the lingua franca of the South Pacific as tapa. The etymology of the word (spelled kapa but pronounced tapa in Hawaii) is ka (the) and pa (beaten or the beaten thing). Emery (1966) in her description, prefaces bark cloth with "pounded." Bark cloth has many local names in Oceania, depending on the islands of its manufacture (e.g. siapo, Samoa; masi, Fiji; ngatu, Tonga; ahu, Tahiti). In some cases, both the source tree and the cloth have the same name. In Polynesia, the three trees most utilized are *Broussonetia papyrifera*, (not native, always cultivated); *Artocarpus altilis*, (not native, cultivated for food as well as for bark cloth); *Ficus* spp. (growing wild

in the Pacific). Notably in Hawaii, the inner bark of other plants was once used. A *Pipturus* species and *Hibiscus tiliaceus* are especially mentioned. The inner bark of *Broussonetia papyrifera* was invariably and everywhere preferred as the source of the best quality of bark cloth and the one always used for purposes associated with rank and ceremony.

Planting, cultivating and harvesting the material for bark cloth is man's work. Once the material is provided, all the rest of the labor of making bark cloth is woman's work, with rare exceptions when men make cloth for a special occasion under conditions of taboo and other traditionally imposed restrictions.

To summarize: the making of bark cloth in Polynesia varies in details that defy generalization. In Kooijman's comments with supplementary notes on the pieces in the Botanical Museum's collection, only the pertinent among these details are described. There are many more, equally significant and equally widespread, among which are the following: of dyeing methods used in painting characteristic patterns; of joining pieces by pasting or felting; of the use of design tablets and rubbing on colors; of the occasional scenting of bark cloth to counteract a somewhat unpleasant odor (especially of newly made cloth); of the use of glazes to preserve colors or to provide a measure of waterproofing.

Kooijman (1972 and 1977) sums up variants of technique in both text and a series of tables. Both Brigham (1976) and Degener (1975) contribute ethnobotanical data that by necessity Kooijman does not include in his more specialized approach.

Wrote Rudyard Kipling:

There are nine and sixty ways
of constructing tribal lays,
Any every-single-one-of-them
-is-right!

—and he could well have been writing, instead, of the nine and sixty ways and many more, of “constructing” bark cloth in Polynesia.

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The manufacture and uses of bark cloth by the island dwellers of the South Pacific constitute a culture trait that although it

displays marked similarities among island clusters also shows enough important differences to preclude unqualified description.

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PLATE 13

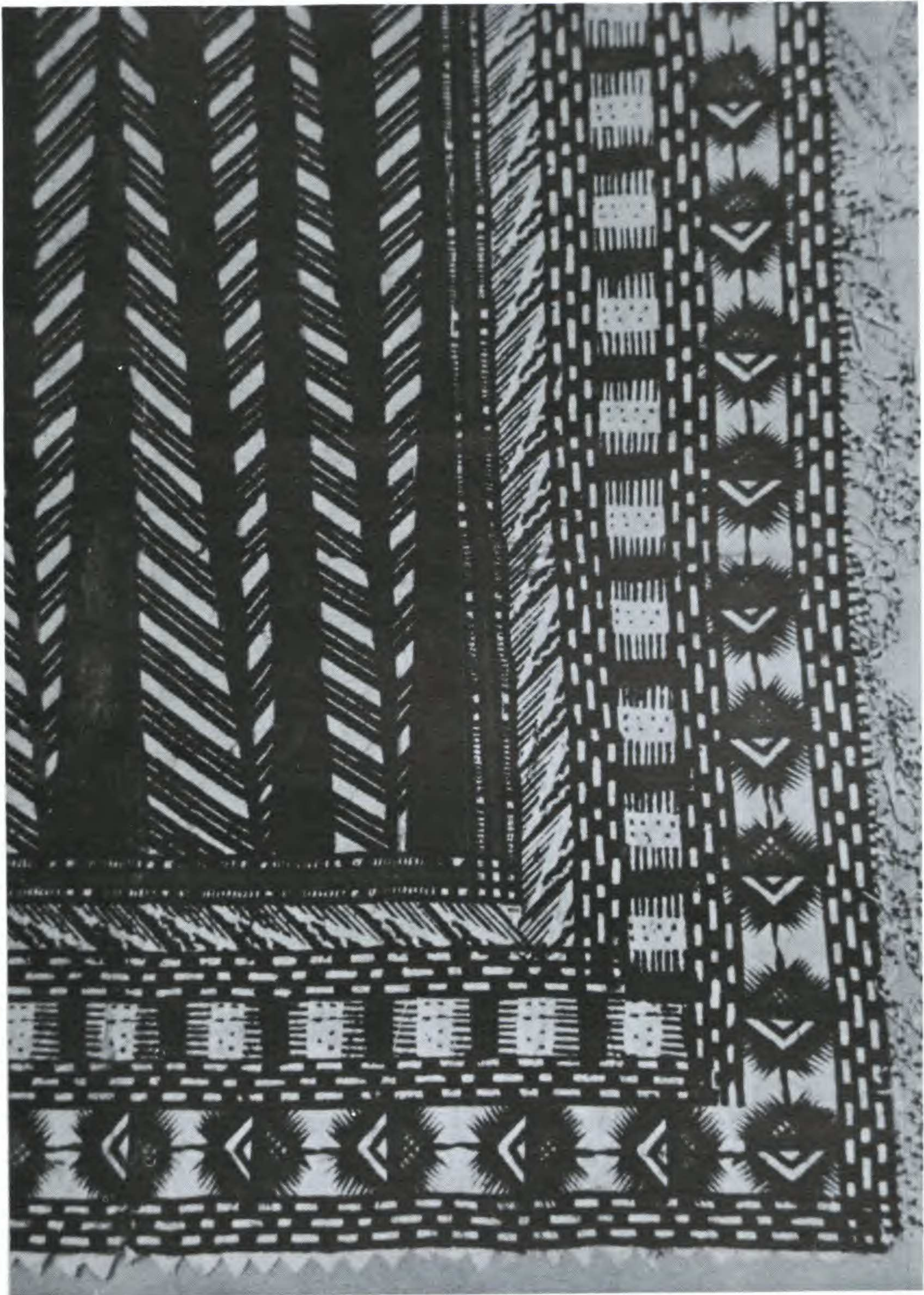


Plate 13. Illustrating a popular motif, the so-called "hairy diamonds".

PLATE 14

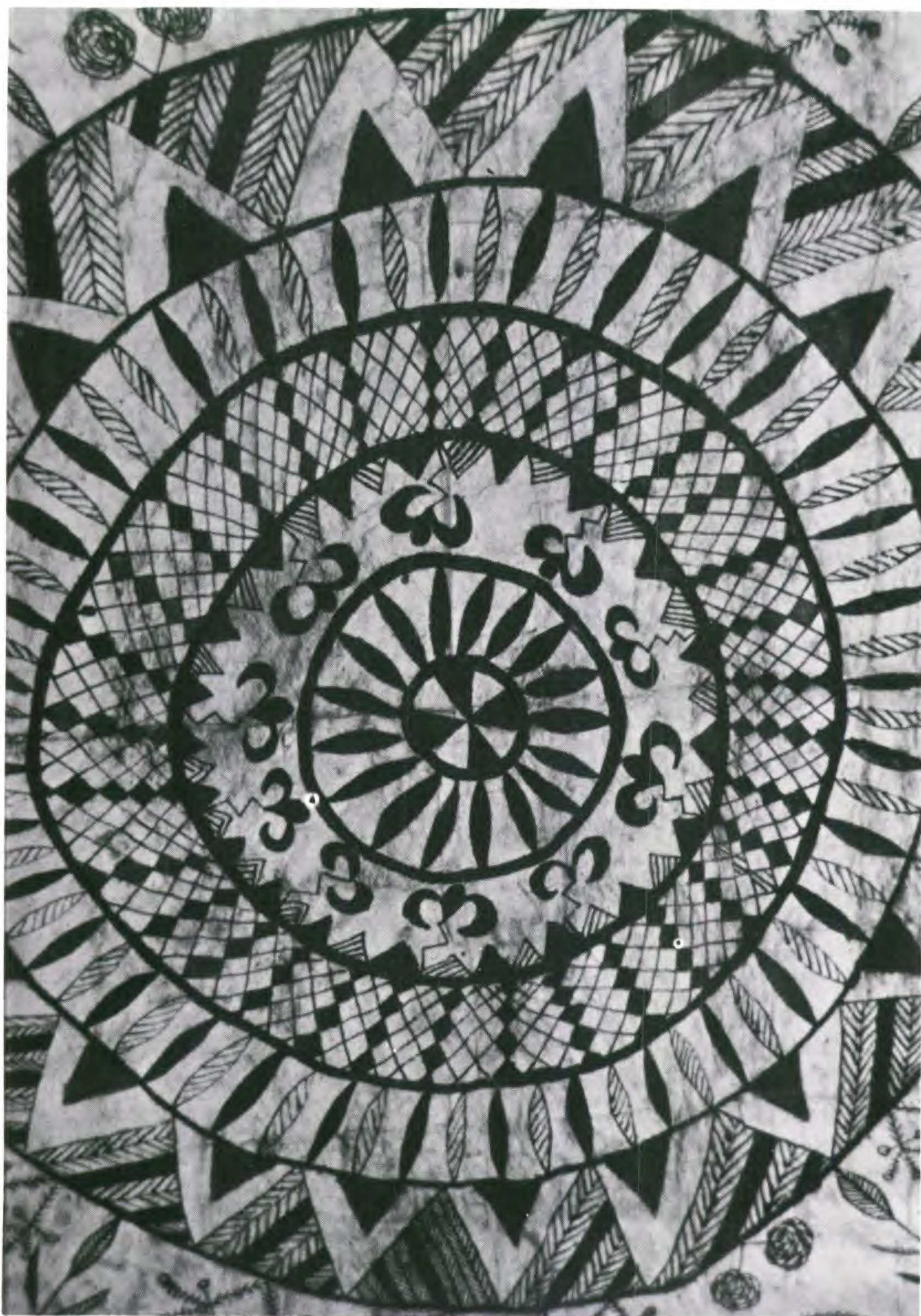


Plate 14. Illustrating an unidentified motif repeated in a circular pattern; perhaps a stingray with zigzag tail.